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10/694,005	10/28/2003	Yojiro Matsueda	117554	3671

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EXAMINER

BODDIE, WILLIAM

ART UNIT	PAPER NUMBER
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2629

DATE MAILED: 05/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Drawings

1. Figures 7 and 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 7-12 and 24-26 are objected to because of the following informalities: Throughout these claims there are limitations such as, "2n-1 times" and "2n+1 levels." However within the Specification the Applicant only discusses terms such as, 2^{n-1} and 2^{n+1} . It appears that the Applicant intended for these terms to be superscripted as enabled in the Specification. This assumption will be made upon the current examination of the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first and second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 7-12, and 24-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As currently written there are numerous ways to interpret these claims. The absence of any direction from grammatical cues (i.e. commas, semicolons) and order of limitations makes the metes and bounds of these claims very unclear. One specific example is whether to exclude two sub-frames when calculating the value of "n sub-frames" in claims 7 and 24.

Additionally, none of the Applicant's embodiments appear to coincide with the sub-frame limitations as currently claimed in claims 9 and 10.

Finally, there appears to be conflicting limitations within claims 7-10 and 24-25. Each claim recites, "so that at least two levels of brightness can be set for one frame." Then at the end of the claim, a contradictory limitation states, "brightness for one frame can be set to $2n+1$ levels."

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-15, 23-26 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Wakitani et al. (US 5,940,142).

With respect to claim 1, Wakitani discloses, an electro-optical device, comprising:

a plurality of pixels, each of the plurality of pixels having an electro-optical element (col. 1, lines 27-37), brightness of each of the electro-optical elements being set for each of a plurality of sub-frames (sub1-sub8b in fig. 1), which constitute one frame of a period (1 field is equivalent to one frame) and each have a predetermined period (clear from fig. 1), so that at least two levels of brightness can be set for one frame (fig. 3 shows the possible 256 levels of brightness possible), and the plurality of sub-frames including at least two sub-frames (sub8a and sub8b, sub7 in fig. 1) having the same period of length (specifically $64=2^6=(1/2)\times 2^7$).

With respect to claim 2, Wakitani discloses, the electro-optical device according to claim 1 (see above), the at least two sub-frames having the longest period among the plurality of sub-frames (clear from fig. 1).

With respect to claim 3, Wakitani discloses, the electro-optical device according to claim 2 (see above), a sub-frame having the longest period (Sub6 in fig. 1) among the plurality of sub-frames excluding the at least two sub-frames being half as long as the sub-frames having the longest period among the plurality of sub-frames ($2^5=32$ clear this is half of 64).

With respect to claim 5, Wakitani discloses, an electro-optical device, comprising:

a plurality of pixels, each of the plurality of pixels having an electro-optical element (col. 1, lines 27-37), brightness of each of the electro-optical elements being

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set for each of a plurality of sub-frames (sub1-sub8b in fig. 1), which constitute one frame of a period (1 field is equivalent to one frame) and each have a predetermined period (clear from fig. 1), so that at least two levels of brightness can be set for one frame (fig. 3 shows the possible 256 levels of brightness possible), and lengths of the plurality of sub-frames excluding two sub-frames having the longest period (sub8a and sub8b in fig. 1) being set to a period in binary weighted (clear from fig. 1 that the sub-frames are binary weighted).

With respect to claims 6, 8, 10 and 15 (as best understood by the Examiner), Wakitani discloses, the electro-optical device according to claims 5, 7, 9 and 13, the two sub-frames (sub8a and sub8b) not being arranged consecutively in one frame of a period (clear from fig. 1.).

With respect to claim 7 (as best understood by the Examiner), Wakitani discloses, an electro-optical device, comprising:

a plurality of pixels, each of the plurality of pixels having an electro-optical element (col. 1, lines 27-37), brightness of each of the electro-optical elements being set for each of a plurality of sub-frames (sub1-sub8b in fig. 1), which constitute one frame of a period (1 field is equivalent to one frame) and each have a predetermined period (clear from fig. 1), so that at least two levels of brightness can be set for one frame (fig. 3 shows the possible 256 levels of brightness possible), and a sub-frame having the longest period among n (n denotes a natural number) sub-frames (sub7 in fig. 1) of the plurality of sub-frames excluding two sub-frames having the longest period (sub8a and sub8b; n is seen as 7) being set to 2^{n-1} times as long as a sub-frame having

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the shortest period (Sub1 in fig. 1) among the n sub-frames (sub7 is equal to $2^6=2^{7-1}$; sub1 is equal to 1) and brightness for the one frame can be set to 2^{n+1} levels (fig. 3 shows the possibility of $256=2^{7+1}$ levels)

With respect to claim 9 (as best understood by the Examiner), Wakitani discloses, an electro-optical device, comprising:

a plurality of pixels, each of the plurality of pixels having an electro-optical element (col. 1, lines 27-37), brightness of each of the electro-optical elements being set for each of a plurality of sub-frames (sub1-sub8b in fig. 1), which constitute one frame of a period (1 field is equivalent to one frame) and each have a predetermined period (clear from fig. 1), so that at least two levels of brightness can be set for one frame (fig. 3 shows the possible 256 levels of brightness possible), and the sum of two sub-frames (sub8a and sub8b in fig. 1; sum of sub8a and sub8b= $128=2^7$) having the longest period among the plurality of sub-frames being set to 2^n times as long as a sub-frame having the shortest period (sub1=1) among the n sub-frames (7 sub-frames left after excluding the two longest period sub-frames) and brightness for one frame can be set to 2^{n+1} levels (fig. 3 shows the possibility of $256=2^{7+1}$ levels)

With respect to claim 11 (as best understood by the Examiner), Wakitani discloses, an electro-optical device, comprising:

a plurality of pixels, each of the plurality of pixels having an electro-optical element (col. 1, lines 27-37), brightness of the electro-optical element being set for each of a plurality of sub-frames (sub1-sub8b in fig. 1), which constitute one frame (one field is equivalent to one frame) of a period and each have a predetermined period (clear

from fig. 1), so that at least 2^n levels of brightness ($n=7$; $2^7 \leq 256$ levels shown in fig. 3) can be set for one frame, and number of the plurality of sub-frames being $n+1$ or more (number of sub-frames in fig. 1 is $9 \geq 7+1$).

With respect to claim 12 (as best understood by the Examiner), Wakitani discloses, the electro-optical device according to claim 11 (see above), a sub-frame having the longest period (sub 8b= $64=(1/2) \times 2^7$) among the plurality of sub-frames being 2^{n-1} times ($7=n$ from claim 11; $2^7=64$) as long as a sub-frame having the shortest period (sub1; clearly sub8b is 64 times as long as sub1).

With respect to claim 13, Wakitani discloses, an electro-optical device, which is capable of setting at least two levels of brightness for one frame (fig. 3 shows 256 possible levels), the electro-optical device comprising:

electro-optical elements that controlled to take either an ON state or an OFF state based on gray scale data for each of a plurality of sub-frames (see ON and OFF of fig. 3), which constitute one frame of a period and each have a predetermined period (clear from fig. 1), and at least two of the plurality of sub-frames (sub8a and sub8b) being controlled to always concurrently take either the ON state or the OFF state (col. 10, lines 38-40; also note the concurrent operation of sub8a/8b in fig. 3).

With respect to claim 14, Wakitani discloses, the electro-optical device according to claim 13 (see above), the at least two sub-frames having the same period of length (sub8a = sub8b is clear from fig. 1).

With respect to claim 23 (as best understood by the Examiner), as claim 23 is nothing more than a method step claim having identical limitations to those recited in

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claim 6. Therefore claim 23 is rejected on the same merits shown above in claims 5 and 6.

With respect to claim 24 (as best understood by the Examiner), as claim 24 is nothing more than a method step claim having identical limitations to those recited in claim 8. Therefore claim 22 is rejected on the same merits shown above in claims 7 and 8.

With respect to claim 25 (as best understood by the Examiner), as claim 25 is nothing more than a method step claim having identical limitations to those recited in claim 10. Therefore claim 25 is rejected on the same merits shown above in claims 9 and 10.

With respect to claim 26 (as best understood by the Examiner), as claim 26 is nothing more than a method step claim having identical limitations to those recited in claims 11-15. Therefore claim 26 is rejected on the same merits shown above in claims 11-15.

With respect to claim 30, Wakitani discloses, an electronic apparatus (col. 1, lines 8-12), comprising: the electro-optical device according to claim 1 (see above).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 4, 17, 22 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakitani et al. (US 5,940,142) in view of Shigeta et al. (US 6,297,788).

With respect to claim 4 (as best understood by the Examiner), Wakitani discloses, the electro-optical device according to claim 1 (see above).

Wakitani does not expressly disclose, the at least two sub-frames not being arranged consecutively in one frame of a period.

Shigeta discloses, at least two sub-frames (2nd, 4th and 6th sub-frame in fig. 30), which each have the same longest period (64), are not arranged consecutively (clear from fig. 30) in one frame of a period (clear from fig. 30).

Wakitani and Shigeta are analogous art because they are both from the same field of endeavor namely sub-field design to generate gray scale display.

At the time of the invention it would have been obvious to one of ordinary skill in the art to order the sub-fields of Wakitani as taught by Shigeta.

The motivation for doing so would have been to prevent flicker in the display (Shigeta; col. 2, lines 15-19).

Therefore it would have been obvious to combine Wakitani with Shigeta for the benefit of preventing flicker to obtain the invention as specified in claim 4.

With respect to claim 17, Wakitani discloses, the electro-optical device according to claim 1 (see above), the plurality of sub-frames (sub1-sub8b in fig. 1), which are set for a series of pixels among the plurality of pixels, ending substantially simultaneously (clear from fig. 1 that the sub-frames (grayed area) end simultaneously).

Shigeta discloses, the series of pixels being connected to at least two scanning lines (fig. 7a-7h).

At the time of the invention it would have been obvious to one of ordinary skill in the art to set a series of pixels of Wakitani that are connected to at least two scanning lines, as taught by Shigeta.

The motivation for doing so would have been to prevent flicker in the display (Shigeta; col. 2, lines 15-19).

Therefore it would have been obvious to combine Wakitani with Shigeta for the benefit of preventing flicker to obtain the invention as specified in claim 17.

With respect to claim 22, as claim 22 is nothing more than a method step claim having identical limitations to those recited in claim 4. Therefore claim 22 is rejected on the same merits shown above in claims 1 and 4.

With respect to claim 28, as claim 28 is nothing more than a method step claim having identical limitations to those recited in claims 1 and 17. Therefore claim 28 is rejected on the same merits shown above in claims 1 and 17.

9. Claims 16, 18-21, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakitani et al. (US 5,940,142) in view of Adachi et al. (US 6,924,824).

With respect to claim 16, Wakitani discloses, the electro-optical device according to claim 1 (see above), the plurality of sub-frames (sub1-sub8b in fig. 1), which are set for a series of pixels among the plurality of pixels, starting and ending

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substantially simultaneously (clear from fig. 1 that the sub-frames (grayed area) start and end simultaneously).

Wakitani does not expressly disclose that, the series of pixels are connected to one scanning line.

Adachi discloses, a gray scale driving method that selects a series of pixels that are connected to one scanning line (col. 6, lines 4-14).

Adachi and Wakitani are analogous art because they are both from the same field of endeavor namely, sub-field design to obtain an effective gray scale.

At the time of the invention it would have been obvious to one of ordinary skill in the art to scan the series of pixels of Wakitani that are connected to one scanning line, as taught by Adachi.

The motivation for doing so would have been to further decrease flicker as well as power conservation (Adachi; col. 6, lines 27-36).

Therefore it would have been obvious to combine Wakitani with Adachi for the benefit of power conservation to obtain the invention as specified in claim 16.

With respect to claim 18, Wakitani and Adachi disclose, the electro-optical device according to claim 16 (see above).

Adachi further discloses, pixels circuits (fig. 13), each of the pixel circuits including:

a first transistor (402 in fig. 13) put into a conductive state when the scanning line (Gj) thereof is selected;

a capacitor element (404) holding a data signal supplied through the first transistor (402);

a second transistor (405) switched to an ON state or an OFF state based on the data signal held in the capacitor element (404); and

an electronic element (406) to which a driving current is supplied based on the ON state of the second transistor (405; col. 2, line 60 – col. 3, line 20).

With respect to claims 19-21, Wakitani and Adachi disclose, the electro-optical device according to claim 18 (see above).

Adachi further discloses, the electronic element being a current-driven organic EL element (col. 1, lines 26-30).

With respect to claim 27, as claim 27 is nothing more than a method step claim having identical limitations to those recited in claim 16. Therefore claim 27 is rejected on the same merits shown above in claims 1 and 16.

With respect to claim 29, as claim 29 is nothing more than a method step claim having identical limitations to those recited in claims 1 and 18. Therefore claim 29 is rejected on the same merits shown above in claims 1 and 18.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Will Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:00 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

5/18/06
wlb

AMR A. AWAD
PRIMARY EXAMINER

A handwritten signature in black ink, appearing to read 'Amr A. Awad', written over a horizontal line.